152a Fumaric Acid Production from Glucose and Cornstarch by Immobilized Cells of Rhizopus Oryzae in a Rotating Fibrous Bed Bioreactor

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Fumaric acid, a potential chemical building block identified by DOE, is currently produced through catalytic oxidation of benzene, which is a well known cancerigenous substance and is from petroleum. There is a high interest to produce fumaric acid from renewable resources using an aerobic fermentation by *Rhizopus oryzae*. However, the filamentous morphology is usually difficult to control and often cause problems in conventional submerged fermentations. The fungal morphology has profound effects on mass transfer, cell growth, and metabolite production. Controlling the filamentous morphology by immobilization on a rotating fibrous matrix was studied for its effects on oxygen transfer and fumaric acid production. Compared to the conventional stirred tank fermentor, the fermentation carried out in the rotating fibrous bed bioreactor (RFBB) resulted in a good control of the filamentous morphology, and improved oxygen transfer and fumaric acid production from glucose and starch. This strain requires the fixation of CO_2. As pH would affect the CO_2 concentration in the fermentation broth, the pH effect on fumaric acid fermentation was also studied and the results will be presented in this paper.